

Long-term surveillance framework 2021–2027

April 2023

1 A case and vision for EU/EEA surveillance

Surveillance of infectious diseases in the European Union/European Economic Area (EU/EEA) builds on national surveillance systems. It neither merely combines nor merely complements national data collections and analyses but rather enhances them, adding a supranational layer and EU/EEA public health value to what would otherwise be poorly comparable country-specific monitoring activity and statistics. EU/EEA surveillance of infectious diseases is a public health necessity. It enables the early detection, investigation, and communication of cross-border threats arising from infectious diseases and informs timely and effective coordinated response. As one of the cornerstones of disease prevention and control programme monitoring, harmonised EU/EEA surveillance allows policy-makers to compare the effectiveness of different measures across Member States and make the right informed choices. EU/EEA surveillance improves surveillance within Member States by setting common standards, building and maintaining national technical capacity, and also facilitating adequate budget allocation outside of times of crisis. Finally, EU/EEA surveillance creates the platform, communication channels, and shared understanding that are indispensable for effective joint disease prevention and control in Europe.

Vision: EU/EEA infectious disease surveillance is founded on strong harmonised national surveillance systems, an optimal mixture of data sources, and state-of-the-art technology to generate a continuous, automated, integrated and, where required, real-time digital data stream that provides the right information where and when it is needed to most timely and effectively fight cross-border threats to public health from infectious diseases.

2 Background

EU/EEA surveillance

Within its mandate to identify, assess, and communicate current and emerging threats to human health from communicable diseases, ECDC collects, validates, analyses, and disseminates routine surveillance data on notifiable infectious diseases from 30 EU/EEA countries [1,2]. ECDC also carries out global event-based surveillance of potential public health threats to the EU/EEA.

The national bodies in charge of infectious disease surveillance nominate disease experts and public health function experts with cross-cutting surveillance, threat detection and microbiology expertise to dedicated EU/EEA networks coordinated by ECDC. The disease experts report national routine surveillance data to ECDC while the public health function experts have the overall responsibility in their areas of expertise and advise ECDC strategically.

The objectives of EU/EEA surveillance are to:

- Detect and monitor any multinational infectious disease outbreaks with respect to source, time, population, and place in order to provide a rationale for public health action;
- Monitor trends in infectious diseases over time and across Member States to assess the present situation, respond to rises above warning thresholds and facilitate appropriate evidence-based action;
- Contribute to the evaluation and monitoring of prevention and control programmes targeted at infectious diseases in order to provide the evidence for recommendations to strengthen and improve these programmes at the national and European level;
- Identify population groups at risk and in need of targeted prevention measures;
- Contribute to the awareness of and the assessment of the burden of infectious diseases on the population using such data as disease prevalence, complications, hospitalisation, and mortality; and
- Generate hypotheses on (new) sources, modes of transmission and groups most at risk and identify needs for research and pilot projects.

The list of diseases under EU surveillance and their case definitions are established by EU law [3]. For international event-based surveillance, the scope includes all possible infectious diseases. Both EU/EEA indicator-based and event-based surveillance also serve to meet reporting obligations under the International Health Regulations. Data comparability across Member States is further enhanced by common reporting protocols, external quality assessment of laboratory performance and regular exchange of best practice within the EU/EEA networks. The General Data Protection Regulation explicitly permits the processing of the most sensitive personal data if this 'is necessary for reasons of public interest in the area of public health, such as protecting against serious cross-border threats to health' [4].¹

The routine EU/EEA surveillance outputs include the Surveillance Atlas of Infectious Diseases [5], the Annual Epidemiological Reports [6], daily and weekly communicable disease threat reports [7], a number of enhanced surveillance reports produced jointly with other EU agencies or the World Health Organization (WHO), weekly bulletins, and online maps. These routine outputs are complemented with articles in peer-reviewed scientific journals.

Strategic context

This long-term surveillance framework is the continuation of previous multi-annual surveillance strategies, each of which had its own particular focus. In the first years following its inception, 2006–2008, ECDC evaluated the existing European dedicated surveillance networks and created the IT infrastructure and processes to support a more centralised system [8]. Between 2008 and 2013, ECDC took over the coordination of the formerly outsourced surveillance networks, created new ones such as for hepatitis B and C, streamlined data collection, validation and analysis across diseases, and consolidated surveillance outputs [9]. Since 2014, priorities have been to integrate molecular and genomic [10], determinant and big data, enrich data analysis with more advanced statistics and modelling, standardise and automate routine surveillance outputs for improved timeliness, online access and interactivity, and broaden the public health and scientific impact of EU/EEA infectious disease surveillance data by publishing findings in peer-reviewed scientific journals and drawing attention through public events and social media [11].

This long-term surveillance framework ties in with the overall ECDC strategy 2021–2027 [12]. Aspirations for the coming seven years relevant to surveillance are to promote standards, help bridge the gap between science, policy and practice, provide tailored support to Member States, harness technological innovation, and collaborate with EU enlargement and other neighbourhood countries as well as EU sister agencies, WHO, global centres for disease prevention and control (CDCs) and other relevant players.

This framework reflects and implements the recently enacted EU legislation: the amended ECDC Founding Regulation [1] and the new Regulation on serious cross-border threats to health [2]. ECDC is now explicitly mandated to promote the digitalisation and integration of EU/EEA surveillance, help strengthen national surveillance systems, expand and integrate data sources and digital platforms, connect to the European Health Data Space, increasingly collect and analyse relevant population risk factor prevalence data, and coordinate a newly established network of European Reference Laboratories to strengthen and standardise laboratory capacity across the EU/EEA.

Starting point

EU/EEA infectious disease surveillance has come a long way since ECDC became its central hub. The model of one coordinating competent body per Member State that nominates national experts for the various EU/EEA surveillance networks has improved European coordination and alignment with Member State priorities. The networks remain strong and engaged and enjoy stable EU funding. ECDC collaboration with relevant sister EU agencies and WHO is close and fruitful.

The majority of EU/EEA surveillance systems have been re-evaluated since 2016 and found to largely meet their objectives. The outdated IT platforms supporting EU/EEA surveillance are undergoing substantial reconstruction to

¹ ECDC has consulted the European Data Protection Supervisor on the GDPR implications for EU/EEA surveillance. The outcome of this consultation will be taken into account when implementing the current framework.

improve user experience, performance and interoperability and facilitate their maintenance. EpiPulse, launched in June 2022, is ECDC's online portal for European public health authorities and global partners to collect, analyse, share, and discuss infectious disease data for threat detection, monitoring, risk assessment, and outbreak response. Initial features include a smart platform for event-based surveillance and response support, a suite of molecular surveillance tools, and a one-stop surveillance portal enabling seamless access to all relevant functionalities.

EU/EEA routine surveillance outputs are easily accessible online and allow for some interactive visual data exploration. ECDC, network members and third parties also publish a considerable number of peer-reviewed scientific articles with in-depth analysis of EU/EEA surveillance data. In some areas, such as HIV, modelling based on surveillance data has become firmly established in filling data gaps and informing public health policy and risk communication. Molecular surveillance, especially whole-genome sequencing, is on the rise and has enabled the detection, delineation, investigation and monitoring of several major food-borne outbreaks, SARS-CoV-2 variants as well as outbreaks of multi-drug resistant bacteria at European level. Event-based surveillance has become the cornerstone of global public health threat detection, monitoring and assessment, and many Member States are relying on ECDC services in this area.

What remains to be accomplished?

The list of infectious diseases notifiable at EU/EEA level contains several for which the added public health value of supranational indicator-based surveillance appears questionable and is being thoroughly and systematically re-examined. The reengineering of surveillance-supporting IT platforms is pending its completion. Binding EU/EEA surveillance standards are missing for many diseases and should be agreed upon and closely monitored. This should, as much as possible and to the extent considered useful, include full digitalisation of national surveillance systems, some of which still use paper notifications at the subnational levels.

While the Surveillance Atlas has improved the timeliness of EU/EEA surveillance data dissemination, it would benefit from some slimming down and harmonisation across diseases, leaving some of the highly disease-specific complexity to be captured in more targeted dashboards. Online country profiles providing an overview of national surveillance and system indicators would complement the hitherto prevailing disease perspective and inform tailored capacity-building.

Molecular and genomic typing for surveillance not only remains to be rolled out to more diseases for which it adds European public health value, it also requires meaningful integration with epidemiological, veterinary and food as well as environmental data and careful calibration of the resulting public health response. EU/EEA epidemic intelligence needs to broaden its base of data sources and methods, charting new territories such as big data and artificial intelligence while not neglecting more traditional indicator-based and molecular and genomic typing data. Electronic health records and mobile health (m-health) applications as well as data from other existing sources may hold huge potential for infectious disease surveillance that is waiting to be explored and, possibly, exploited.

ECDC has committed to supporting surveillance in the EU enlargement and European Neighbourhood Policy (ENP) countries as well as helping the Africa Centres for Disease Control and Prevention (CDC) to plan and implement infectious disease surveillance across the continent. This provides the opportunity for similar standards beyond the EU, where applicable and appropriate.

Within the EU/EEA, there is room for improvement in translating EU/EEA surveillance findings into outputs that are more immediately relevant to informing policy and public health practice.

This framework takes into account the repercussions of the COVID-19 pandemic. With COVID-19, the world has witnessed the worst pandemic since 1918, and surveillance systems across the globe have struggled to keep pace with the explosive dynamics of virus transmission, morbidity, and mortality. In the EU/EEA, epidemiological data were often delayed and not easily comparable across Member States, and important health system information was missing or difficult to obtain. The weaknesses exposed during this global public health emergency, the creative solutions found and the lessons learned should all contribute to strengthening EU/EEA surveillance in the coming seven years.

ECDC, the European Commission, and EU/EEA Member States working in partnership

EU/EEA surveillance is a joint effort, and this framework can only be implemented in very close collaboration between ECDC, the European Commission, and the Member States. While ECDC has been receiving additional resources to implement its broader mandate, this is not true for most national surveillance institutes, many of which were already facing staff shortages prior to the COVID-19 pandemic. Another limiting factor to be taken into account is the heterogeneity in public health staffing and funding across Member States. In order to avoid overburdening national institutes, this framework emphasises a stricter prioritisation of diseases under EU/EEA surveillance, and more efficient, automated processes. Where new EU/EEA systems are to be set up, they should as much as possible build on national systems already in place and collect the minimum of data at the minimum frequency required to meet the public health objectives. Member States with limited capacity to fully participate in EU/EEA surveillance will benefit from targeted external evaluation and support, including access to EU public health funding (such as the EU4Health and other Union programmes).

3 Methods

Guiding principles

This surveillance framework is meant to:

- Be aligned with and contribute to the implementation of the overall ECDC strategy 2021–2027, the amended ECDC Founding Regulation and the new Regulation on serious cross-border threats to health;
- Be concise and focus on actions that are specific, measurable, achievable, relevant, and time-bound (SMART);
- Pursue actions that are cross-cutting rather than disease-specific, and innovative rather than routine;
- Go beyond the mechanics of surveillance to also strengthen the public health and scientific use and impact of surveillance data; and
- Undergo a review and possibly an update in 2024/25.

Stakeholder consultation

At ECDC, this surveillance framework was reviewed by experts in indicator-based and event-based surveillance, molecular and genomic typing, biostatistics, and modelling prior to approval by the Surveillance Steering Committee and the Director (following discussion within the Director Consultation Group). The Member States and the European Commission endorsed the document following consultations with the National Focal Points for Surveillance (NFPS), ECDC's Advisory Forum (AF), and its Management Board (MB).

4 Objectives, actions, targets, and milestones

Objective 1: Increase public health relevance, standardisation, and efficiency of EU/EEA infectious disease surveillance

Action 1.1: Prioritisation of diseases under indicator-based surveillance

Revise the list of diseases/related special health issues under EU/EEA surveillance to clarify public health priorities, reduce reporting burden, and better focus scarce resources.

Target: Proposal shared with European Commission on which low-priority diseases to remove from the list (2023).

Milestones:

- ECDC to prepare and agree with NFPS and AF on process and criteria (2021);
- ECDC to apply criteria and seek NFPS and AF endorsement of resulting changes (2022–2023);
- ECDC to share proposal with the European Commission (2023).

Action 1.2: Objective-driven surveillance standards

Establish objective-driven EU/EEA surveillance standards for each disease/related special health issue under EU/EEA surveillance to ensure adequacy and harmonisation of surveillance systems across Member States.

Target: Objective-driven EU/EEA surveillance standards for each disease/related special health issue under EU/EEA surveillance published on the ECDC web portal (2023–2027).

Milestones:

- Disease networks to review and possibly update their surveillance objectives (2022);
- ECDC to prepare and agree with disease networks on objective-driven surveillance standards (e.g. system design, frequency of reporting, metadata, data quality, outputs) for each disease/related special health issue under EU/EEA surveillance (2023–2026);
- ECDC to seek NFPS endorsement of all (and AF endorsement for any controversial new) surveillance standards (2023–2026);
- ECDC to publish all EU/EEA surveillance standards on its web portal as they are endorsed;
- ECDC to monitor and regularly inform disease networks, NFPS, the Commission and the Health Security Committee on ECDC and Member State compliance with the agreed surveillance standards.

Action 1.3: More efficient reporting and data validation

Improve the efficiency and user experience of reporting to ECDC to save resources at Member State level and ensure compliance with agreed data quality standards.

Target: Improved automated data validation and epidemiologically meaningful validation feedback in place for annual data call (roll-out: 2021–2024).

Milestones:

- ECDC to reduce the first-step automated batch validation to the minimum required to ensure technical data compatibility (2021–2024);
- ECDC to develop disease-specific epidemiologically meaningful validation reports that are returned to the data providers immediately following data submission and allow them to assess their data quality and the appearance of their data in ECDC routine surveillance outputs prior to approving their data for analysis and publication (2021–2024).

Action 1.4: Automated epidemic intelligence (EI)

Use artificial intelligence to automate EI processes for better timeliness and more efficient resource management.

Target: EI processes automated (2024).

Milestones:

- ECDC to automate signal detection from routine EI (2022);
- ECDC to automate signal detection from determinant data (2024);
- ECDC to automate routine EI outputs (2023);
- ECDC to develop tools to support signal filtering and assessment and to propose appropriate public health actions (2024).

Objective 2: Unlock existing and new data sources for more comprehensive EU/EEA infectious disease surveillance, prevention, and control

Action 2.1: Whole-genome sequencing roll-out

Roll out whole-genome sequencing to support timely detection, investigation, and monitoring of multinational outbreaks.

Target: EU/EEA genomic-typing-enhanced surveillance rolled out as per agreed strategic framework (2027).

Milestones:

- ECDC and Member States to update the strategic framework for the integration of molecular and genomic typing into European surveillance and multi-country outbreak investigations at regular intervals;
- ECDC and Member States to implement whole-genome sequencing as per strategic framework and available resources (2022–2027);
- ECDC and Member States to agree on standards of whole-genome sequencing nomenclature and interpretation as well as criteria for triaging clusters detected through this technology (2022–2027);
- ECDC and Member States to agree on the integration of epidemiological surveillance data and the appropriate triggers for and types of ensuing public health action (2022–2027).

Action 2.2: Holistic epidemic intelligence

Integrate event-based and indicator-based surveillance, molecular and genomic typing as well as big data for more accurate and comprehensive threat detection and assessment.

Target: Routines for integration of indicator-based surveillance and molecular and genomic typing as well as big data in place and reflected in the communicable disease threat reports (2027).

Milestone:

- ECDC to systematically explore the value of indicator-based, molecular and genomic surveillance and big data for EI (2021–2023);
- ECDC to develop routines for EI integration of elements of indicator-based, molecular and genomic surveillance and big data found to be useful (2024–2027);
- ECDC to reflect these newly integrated elements in its EI outputs (2024–2027).

Action 2.3: Integrated sentinel hospital surveillance

Set up an EU/EEA sentinel hospital system for integrated surveillance of severe cases across several infectious diseases to better understand and be able to prevent relevant risks.

Target: EU/EEA sentinel hospital system for integrated surveillance of severe infectious diseases up and running (2025).

Milestones:

- ECDC to expand hospital-based severe acute respiratory infection (SARI) surveillance to include COVID-19 (2021);
- ECDC and Member States to agree on diseases to be covered subsequently, surveillance objectives, system design, reporting protocols, routine outputs, and inclusion criteria for hospitals (2021);
- ECDC and Member States to invite expressions of interest from hospitals (2021);
- ECDC and Member States to prepare IT systems for electronic data collection through Coordinating Competent Bodies (2021);
- ECDC and Member States to select and train suitable sentinel sites, establish a network of national system representatives, and organise a kick-off meeting (2021);
- ECDC to launch first data call (2021);
- ECDC to integrate existing sentinel hospital surveillance systems (2022–2025).

Action 2.4: Early outbreak detection and pandemic preparedness

Improve early multi-country outbreak detection and pandemic preparedness for more timely coordinated response.

Target: Integrated sentinel surveillance of respiratory viral infections, weekly or, where required, real-time laboratory surveillance of suitable outbreak-prone diseases and minimum pandemic surveillance dataset operational (2027)

Milestones:

- ECDC, WHO, and EU/EEA and European Regional Member States to fully integrate sentinel surveillance of respiratory viral infections (including at least influenza, RSV, and SARS-CoV-2) and to set up a new weekly online bulletin (2023);
- ECDC and Member States to set up weekly or, where required, real-time laboratory surveillance of suitable outbreak-prone diseases, building on digital information systems and data flows of national and regional reference laboratories to Coordinating Competent Bodies (2023–2027, cf. action 2.5);
- ECDC to include pandemic surveillance provisions when outsourcing sentinel hospital surveillance of severe infectious diseases (cf. action 2.3);
- ECDC and Member States to systematically use whole-genome sequencing for the early detection and investigation of multi-country clusters (cf. action 2.1);
- ECDC and EFSA to establish a joint One Health sequencing database for integrated detection, investigation and monitoring of food-borne outbreaks (2022);
- ECDC, the WHO Regional Office for Europe, and Member States to agree on minimum surveillance datasets to be collected during the different phases of a pandemic, including relevant health systems and other determinants as well as response information, and the triggers to activate them (2023);
- ECDC to prepare and maintain IT platforms for collection, analysis, and dissemination of minimum pandemic surveillance dataset (2024);
- ECDC to intensify capacity-building in Member States unable to comply with agreed surveillance standards (2021–2027, cf. actions 1.2 and 4.1).

Action 2.5: Innovation

Explore innovative approaches to EU/EEA infectious disease surveillance and evaluate their public health value.

Target: Evaluation reports on artificial intelligence, data lakes, m-health, e-health, spatial epidemiology, and participatory syndromic surveillance published, and weekly laboratory surveillance of outbreak-prone diseases operational (2027).

Milestones:

- ECDC to assess the impact of new digital and laboratory diagnostic technologies on public health key functions and develop a roadmap for their gradual integration in routine practice (2021);
- ECDC to actively contribute to the e-health network, European Health Data Space, and relevant future EU or international initiatives to ensure e-health data standards conducive to secondary data use for EU/EEA infectious disease surveillance (2021–2022);
- ECDC to explore the feasibility and added public health value of using artificial intelligence to support and enhance global epidemic intelligence-gathering (2021–2024, cf. action 1.4);
- ECDC and Member States to set up alternative surveillance systems for SARI, bloodstream infections and other diseases or special health issues to explore the feasibility and added public health value of using electronic health records (2021–2024);

- ECDC to assess barriers to the use of electronic health information for infectious disease surveillance and to pilot ways to overcome these barriers in collaboration with Member States (2024);
- ECDC and Member States to set up weekly or, where required, real-time laboratory surveillance of suitable outbreak-prone diseases, building on digital information systems and data flows of national and regional reference laboratories (2023–2027, cf. action 2.4);
- ECDC and Member States to explore the value of wastewater surveillance for the early detection and monitoring of public health threats (2024);²
- ECDC to explore the added value of routinely employing spatial epidemiology to scan subnational surveillance data for cross-border geographic clusters (2024–2027);
- ECDC to explore the added value of participatory syndromic surveillance (2024–2027).

Objective 3: Improve public health and scientific impact of EU/EEA infectious disease surveillance

Action 3.1: Targeted routine outputs

Refine the targeting of EU/EEA surveillance routine outputs to match the needs of their prime audiences and increase their public health impact.

Target: Revised/new outputs publicly available (2025).

Milestones:

- ECDC to simplify the Surveillance Atlas and harmonise its logic across diseases to display only basic epidemiological indicators for non-disease experts (2023);
- ECDC to rethink the format of the Annual Epidemiological Reports with the aim of finding the right balance between timeliness and comprehensiveness (2023–2024);
- ECDC to develop epidemiological online country profiles across diseases to enable benchmarking across Member States and inform tailored country support (2023);
- ECDC to develop automated EI dashboards to facilitate the early detection and efficient monitoring of threats over time (2023);
- ECDC to develop disease-specific online dashboards that offer experts the full breadth and depth of epidemiological and data quality indicators (2024–2025).

Action 3.2: Surveillance-based applied public health studies

Conduct studies based on EU/EEA infectious disease surveillance data specifically aimed at informing disease prevention and control.

Target: Evidence published in peer-reviewed open-access scientific journals (2025–2027).

Milestones:

- ECDC to seek advice from its AF on priority diseases/related special health issues under EU/EEA surveillance that should be targeted more aggressively for prevention and control (2023);
- ECDC to compile the existing prevention and control evidence for these priority diseases/related special health issues (2024);
- ECDC and disease networks to identify and prioritise the most relevant applied public health research questions for these priority diseases that might be answered through surveillance data and have these research questions endorsed/supplemented by the AF (2024);
- ECDC and disease networks to prepare multiannual study plans and form dedicated study groups (2025);
- Study groups to prepare study proposals and have them endorsed by the AF (2025–2027);
- Study groups to combine surveillance and other data, analytical epidemiology, statistics and modelling, as required, to answer the research questions and inform disease prevention and control (2025–2027);
- Study groups to publish their findings in peer-reviewed open access scientific journals (2025–2027).

Action 3.3: Effective risk communication

Systematically use EU/EEA infectious disease surveillance findings to highlight public health risks, and actively reach out to the European Commission, Member States, and media to influence policy and public awareness.

Target: EU/EEA-surveillance-derived public health risk assessments reflected in European Commission outputs and picked up by the media (2027).

² Also considering the outcome of the ongoing review of the urban wastewater treatment directive by the European Commission services.

Milestones:

- ECDC to highlight public health risks in routine EU/EEA surveillance outputs and social media activities;
- ECDC to publish dedicated reports and alert the European Commission about major public health risks;
- ECDC to organise regular online press events to raise public awareness of major public health risks;
- ECDC to create and nurture an EU/EEA network of scientific journalists to simplify and effectively disseminate the Centre's risk communication (2023);
- ECDC to systematically measure and report on the media reach and resonance of its risk communication efforts.

Action 3.4: Open data access

Provide open access to EU/EEA infectious disease surveillance data to promote their dissemination and use for public health science and practice.

Target: Web-based surveillance data warehouse interface in place to enable customised manual download and machine-to-machine consumption of data subsets, aiming to offer findable, accessible, interoperable and reusable data in accordance with the FAIR principles [13] (2023).

Milestones:

- ECDC to develop web-based surveillance data warehouse interface to enable customised manual download and machine-to-machine consumption of data subsets (2023);
- ECDC to provide link to interface on EU Open Data Portal (2023).

Objective 4: Contribute to surveillance capacity-building within Europe and beyond for better global health security

Action 4.1: European reference laboratories (EURLs) for public health

Set up a European Reference Laboratories Network to ensure high-quality laboratory surveillance, optimal support to national reference laboratories, standardisation of methods, and capacity-building through training and external quality assurance (EQA).

Target: EURLs and EURL Network fully operational (2025).

Milestones:

- ECDC to support the European Commission in drafting the relevant implementing act (2023);
- ECDC to support the European Commission in selecting and designating EURLs (2024–2025).

Action 4.2: Digitalised integrated national surveillance systems

Contribute to digitalisation and integration of national surveillance systems through EU4Health grants for Member States.

Target: Improved digitalisation and integration of national surveillance systems in EU/EEA Member States (2024–2027).

Milestones:

- ECDC to assist DG SANTE to define the scope of Member State surveillance plans to be supported (2023);
- ECDC to assist DG SANTE in evaluating the grant applications, if requested (2023);
- ECDC to follow up the grant implementation with the NFPs for Surveillance (2024–2027);
- ECDC to monitor timeliness and quality of national surveillance data as well as the number of events detected following grant implementation (2024–2027).

Action 4.3: Workforce development

Strengthen the role of molecular biology, data science and public health informatics in EU/EEA infectious disease surveillance to modernise the tools and skill set of experts and take full advantage of cutting-edge technology.

Target: Multi-annual ECDC recruitment and training plan developed (2022) and implemented (2027). EPIET, EUPHEM and ECDC continuous professional development curricula supplemented in the areas of molecular biology, data science and public health informatics, as appropriate (2023–2027).

Milestones:

- ECDC and Member States to define the roles and responsibilities of epidemiologists, molecular biologists, data scientists and public health informaticians in EU/EEA infectious disease surveillance (2022);
- ECDC to assess its human resource needs in molecular biology, data science and public health informatics and develop a multi-annual recruitment and training plan (2022);
- ECDC to implement this multi-annual recruitment and training plan (2022–2027);
- ECDC to strengthen the training curricula of EPIET and EUPHEM as well as the continuous professional development programme in the areas of molecular biology, data science and public health informatics, as appropriate (2023–2027).

Action 4.4: Tailored support

Provide tailored surveillance support to EU/EEA Member States and EU enlargement countries, European Neighbourhood Policy countries and the Africa CDC.

Target: All EU/EEA Member States have the capacity to comply with the agreed surveillance standards, and ECDC support to EU enlargement and European Neighbourhood Policy countries as well as Africa CDC provided as planned (2027).

Milestones:

- ECDC to evaluate Member State surveillance systems and routinely monitor Member State surveillance indicators (country profiles, cf. action 3.1) and compliance with EU/EEA surveillance standards to identify possible needs for surveillance support;
- ECDC to offer targeted training, twinning, ECDC country visits and other suitable means of support to help overcome shortcomings and build sustainable capacity in Member States;
- ECDC to identify and advertise EU funding for Member State efforts to fully digitalise their surveillance systems;
- ECDC, in coordination with WHO, to provide comprehensive surveillance support to EU enlargement and European Neighbourhood Policy countries as well as Africa CDC as agreed with the European Commission (2021–2025).

5 Progress monitoring

The table below summarises milestones and responsibilities. ECDC will monitor the implementation of this surveillance framework and share annual status reports with relevant stakeholders. In consultation with the latter, ECDC will also conduct a mid-term review to ensure the framework is still up to date and reflects the latest developments.

Table. Long-term EU/EEA surveillance framework 2021–2027: responsibilities, tentative milestones, and timeline

| Action | Milestone | Responsible | | | Year | | | | | | | |
|--------|--|---|-----------------|--|------|-----|-----|-----|-----|-----|-----|--|
| | | ECDC | DN ¹ | NFPS ² /A F ³ | '21 | '22 | '23 | '24 | '25 | '26 | '27 | |
| 1.1 | Prioritisation of diseases | Process and criteria agreed | X | | X | | | | | | | |
| | | Criteria applied | X | | | | | | | | | |
| | | Changes endorsed | | | X | | | | | | | |
| | | Proposal to EC | X | | | | | | | | | |
| 1.2 | Objective-driven surveillance standards | Surveillance objectives updated | X | X | | | | | | | | |
| | | Surveillance standards agreed | X | X | | | | | | | | |
| | | Surveillance standards endorsed | | | X | | | | | | | |
| 1.3 | More efficient reporting and data validation | Automatic validation rules minimised, automated validation reports in place | X | | | | | | | | | |
| 1.4 | Automated EI | Routine EI signal detection automated | X | | | | | | | | | |
| | | Determinant signal detection automated | X | | | | | | | | | |
| | | Routine EI outputs automated | X | | | | | | | | | |
| | | Tools to support signal filtering/assessment and propose action | X | | | | | | | | | |
| 2.1 | WGS roll-out | Strategic framework updated | X | X | X | | | | | | | |
| | | Roll-out implemented, epi | X | X | | | | | | | | |

| Action | Milestone | Responsible | | | Year | | | | | | | |
|--------|--|--|-----------------|--|------|-----|-----|-----|-----|-----|-----|--|
| | | ECDC | DN ¹ | NFPS ² /A F ³ | '21 | '22 | '23 | '24 | '25 | '26 | '27 | |
| | | integrated, PH actions agreed | | | | | | | | | | |
| 2.2 | Holistic EI | Indicator-based, molecular and big data integrated | X | | | | | | | | | |
| 2.3 | Integrated sentinel hospital surveillance | Parameters agreed, call for expressions of interest | X | | X | | | | | | | |
| | | IT systems prepared | X | | X | | | | | | | |
| | | Sites selected and trained, kick-off meeting held | X | | X | | | | | | | |
| | | First data call | X | | | | | | | | | |
| | | Outsourced systems integrated | X | | | | | | | | | |
| 2.4 | Early outbreak detection and pandemic preparedness | Integrated sentinel surveillance of respiratory viral infections | X | X | | | | | | | | |
| | | Weekly lab surveillance of outbreak-prone diseases | X | X | X | | | | | | | |
| | | Joint database with EFSA | X | | | | | | | | | |
| | | Pandemic provisions when outsourcing sentinel hospital surveillance | X | | | | | | | | | |
| | | Minimum pandemic surveillance datasets agreed | X | | X | | | | | | | |
| | | Minimum pandemic surveillance datasets implemented in ECDC IT platforms | X | | | | | | | | | |
| | | | | | | | | | | | | |
| 2.5 | Innovation | Roadmap for integration of new digital and laboratory diagnostic technologies | X | | X | | | | | | | |
| | | EU e-health data standards take surveillance needs into account | X | | X | | | | | | | |
| | | Proof-of-concept: m-health, data lake | X | X | | | | | | | | |
| | | Wastewater surveillance | X | X | | | | | | | | |
| | | e-health-based surveillance | X | X | | | | | | | | |
| | | Spatial epidemiology to scan subnational surveillance data for cross-border clusters | X | X | | | | | | | | |
| | | Participatory syndromic surveillance | X | X | | | | | | | | |

| Action | Milestone | Responsible | | | Year | | | | | | | |
|--------|---|---|-----------------|--|------|-----|-----|-----|-----|-----|-----|--|
| | | ECDC | DN ¹ | NFPS ² /A F ³ | '21 | '22 | '23 | '24 | '25 | '26 | '27 | |
| 3.1 | Targeted routine outputs | Atlas simplified and harmonised | X | | | | | | | | | |
| | | AER improved | X | | | | | | | | | |
| | | Disease-specific online dashboards | X | X | | | | | | | | |
| | | Country profiles online | X | | X | | | | | | | |
| | | Automated EI dashboards | X | | | | | | | | | |
| 3.2 | Applied PH research | Priority diseases agreed | X | | X | | | | | | | |
| | | Existing evidence compiled | X | | | | | | | | | |
| | | Research questions identified and prioritised | X | X | | | | | | | | |
| | | Research questions endorsed | | | X | | | | | | | |
| | | Multiannual research plans and dedicated study groups | X | X | | | | | | | | |
| | | Study proposals | X | X | | | | | | | | |
| | | Study proposals endorsed | | | X | | | | | | | |
| | | Papers published | X | X | | | | | | | | |
| 3.3 | Effective risk communication | EU/EEA network of scientific journalists created | X | | | | | | | | | |
| | | Dedicated reports on PH risks published | X | | | | | | | | | |
| | | Regular online press events held | X | | | | | | | | | |
| | | Regular media resonance reports shared with stakeholders | X | | | | | | | | | |
| 3.4 | Open data access | Customised manual download and machine-to-machine consumption of data subsets available | X | | | | | | | | | |
| | | Link on EU Open Data Portal | X | | | | | | | | | |
| 4.1 | EURLs | Implementing act | X | | X | | | | | | | |
| | | EURLs designated | X | | | | | | | | | |
| 4.2 | Digitalised integrated national surveillance systems | Scope of EU4Health grants defined | X | | | | | | | | | |
| | | Grant applications evaluated | X | | | | | | | | | |
| | | Grant implementation follow-up | X | | X | | | | | | | |
| | | Impact monitoring | X | | X | | | | | | | |
| 4.3 | Workforce development : molecular biology, data science and public health informatics | Define roles and responsibilities | X | X | | | | | | | | |
| | | Multi-annual recruitment and training plan | X | | | | | | | | | |
| | | Implementation of plan | X | | | | | | | | | |

| Action | Milestone | Responsible | | | Year | | | | | | | |
|--------|------------------|---|-----------------|------------------------------------|------|-----|-----|-----|-----|-----|-----|--|
| | | ECDC | DN ¹ | NFPS ² /AF ³ | '21 | '22 | '23 | '24 | '25 | '26 | '27 | |
| | | Strengthen EPIET and EUPHEM and continuous professional development | X | X | | | | | | | | |
| 4.4 | Tailored support | Member State surveillance systems evaluated | X | | | | | | | | | |
| | | Support to EU enlargement and European Neighbourhood Policy countries | X | | | | | | | | | |
| | | Support to Africa CDC | X | | | | | | | | | |

¹ Disease networks: DN

² NFPS: National Focal Points for Surveillance

³ AF: Advisory Forum

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